A GUIDE FOR ENTERPRISE SELECTION*

INTRODUCTION

Effective planning is a continuous process. Therefore, every farmer must continually evaluate the types of crops and livestock to produce on his farm. In the past, it was possible for a farm operator to select an enterprise mix that could be efficiently used for his productive life. This is no longer the case. Agriculture is as dynamic as the rest of the economy. A plan is of little value unless it serves as a guide for action within changing conditions. Therefore, if plans are to be effective and helpful as a guide, they must be evaluated continuously and revised to fit current and expected future conditions.

Today, personal preferences and family goals, no matter how strong, are modified by the profit maximization objective. There are, however, certain limitations in maximizing income. Within these limitations, each farm operator must try to make the highest profit from the resources he controls including land, labor, and capital. Each farmer must try to determine the enterprise mix which makes most efficient use of his limited resources. There is no one best combination of enterprises that will work best for all farms, even in a particular area. The exact enterprises and the relative intensity of each is an individual farm problem.

The following discussion points out the importance of management and the decision-making function of management. Since determination of the best enterprise combinations and size of each is perhaps the most important single management decision which a farmer must make, a relatively simple method is presented here to assist him in making the decision. The method proposed revolves around the use of enterprise budgets. It might be pointed out that whether a manual or computerized method is used for weighing and selecting alternatives, one of the first steps is that of preparing budgets.

REQUIREMENTS FOR FINANCIAL SUCCESS

In any given community, on farms that appear to be "similar", wide differences in farm net profits can be observed, although farmers in the area are exposed to the same weather conditions and price structure. This means that there are factors other than weather and prices which account for differences in farm profits from one farm to the next in a given area.

The financial success of an particular farmer is determined largely by the resources available, his willingness to work productively, and his ability to manage the farm in such a manner that returns will be maximized. All three of these factors must be present in order to have a successful operation. The operator can spend all of his time working and be a good manager but if he does not have or cannot acquire, the volume necessary for a business to continue to be profitable, he will fail.

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On the other hand, the operator can have sufficient volume and managerial abilities but still fail if he does not apply himself diligently to his work. Also, although honest labor and volume are essential for success, they will be of little value with inefficient direction and management.

HOW TO INCREASE PROFIT

Profits are determined by volume of production, cost of production, and price received for the output. The latter is essentially out of the farmer's control. Therefore, if profits are low, volume must be increased and/or cost per unit of production decreased. This can be done by increasing the resource base, by working more productively and putting in longer hours, and/or by improving one's level of management. In other words, if profits are low, one or more of the requirements are not being met.

Get bigger - If insufficient resources is determined to be the reason for low profits, possibilities for increasing the resource base must be investigated. Two alternatives are available for increasing the resource base, purchase or lease. Is it possible to obtain sufficient resources by either method? If the answer to this question is no, the farmer had better consider off-farm employment possibilities. If the answer to this question is yes, the farmer should determine the alternatives available and select the most profitable means of expansion. Present resources must be considered when adding additional resources. Added resources, whether attained through purchase or lease should complement existing resources and enable the farmer to make more efficient use of his total resources. For example, if a farmer presently has more land than he can handle, profits will not be increased by renting additional acreage. Capital may be the limiting factor. Therefore, the operator should investigate the possibilities for obtaining additional funds. These limited borrowed funds would have alternative uses and should be invested where profit can be increased the most. The farmer must ask himself, where can a limited amount spent increase profit the most? Capital when invested in one place is not available for other opportunities.

Get better - Adequate labor may be available but it is just not being used as efficiently and intensively as possible. For example, volume of output per man probably can be increased by using available labor where returns from its use are highest and by working more of the available hours. Labor should be used where it is most productive. Remember, keeping busy and working productively are distinctly different. In addition, many farmers are underemployed with their current levels of output. Available labor should be used more fully in order to expand existing or to develop new enterprises.

Improved management is another way of increasing profits. As stated previously, all three factors are necessary for a successful operation, but this one, ability in management, has become the most important single factor in farming today.

And, because the most crucial functions of management involve the process of decision-making, the success and survival of a farmer largely depends upon the effectiveness with which this activity is carried out.

Numerous factors are responsible for the importance of management, but probably the most important are the following: 1) increase in farm or enterprise size, 2) increased technological complexity, 3) change in the capitalization of the farm, and 4) the cost-price squeeze.

Increases in the size of farms puts increased stress on management. This increase in size results in more drastic consequences when a management error occurs.

Technological developments in today's commercial agriculture are increasing the productivity of our farms, but these developments confront the farmer with an increasingly complex series of decisions. Under these conditions, he must increasingly supplement his intuition and past experience with research and science in his quest for reliable decisions.

The total investment in the average farm has increased tremendously over the past several years, but with new production technology, an ever-increasing proportion of the total input of agriculture comes from non-farm sources and requires large expenditures. Thus, the management of these resources is more important than at anytime in the past.

The economic environment in which the farmer finds himself is another contributing factor. With the cost-price squeeze the farmer is operating on extremely narrow profit margins, which again increase the importance of management.

TYPES OF MANAGEMENT DECISIONS

Management decisions may be essentially classified as either organizational or operational. Organizational decisions involve selection of the type of farm, size and mix of enterprises, physical facilities to be used with each enterprise, and form of the business organization (i.e., individual proprietorship, partnership, corporation). Operational decisions involve implementing the organizational plan and adapting it to specific conditions and situations within any given year.

Successful management requires that the farmer gives due consideration to both types of decisions. The farmer's level of profit depends upon how well he makes all decisions rather than how well he makes some decisions. He may have an excellent farm organization plan but fail to realize a profit because he does a poor job of making adjustments within the plan to take advantage of current economic and environmental conditions. Similarly, a manager may do an excellent job of daily operations and making adjustments within the plan, but his overall organization is so poorly fitted to his resources that his efforts are poorly rewarded.

REQUIREMENTS FOR DECISION-MAKING

Decision-making requires two things: 1) knowlege, and 2) a method of applying this knowledge to arrive at the best solution to the problem at hand.

Knowledge - A good manager must have a knowledge of the facts and a knowledge of the skills required to make a rational decision.

Facts - In general a farmer must know all of the practical jobs connected with the various enterprises on the farm (e.g., when to plow, when to plant, planting speed, harvesting speed, etc.). There is no substitute for this practical knowledge and experience. It is not gained from textbooks, from professors, or from local bankers. Secondly, he must know the basic facts for production (e.g., varieties, nutrition, breeds, etc.) of the various crop and livestock alternatives being considered. Finally, the farmer must have a knowledge of the economic facts (e.g., costs, yields, etc.) for enterprise presently produced on the farm. Knowledge of all of these facts is necessary in order to arrive at a rational decision.

Skills - The farmer must have a knowledge of economic rules and principles such as opportunity cost, the law of diminishing returns, substitution of factors, fixed and variable costs, and etc. In addition, he must have a knowledge of the decision process. The process involves the following steps: 1) determination of the farmer's objective, 2) determination of the relevant restrictions, 3) determination of feasible alternatives, 4) collection of relevant data, 5) comparison of alternatives, and 6) selection of the alternative(s) which most nearly satisfies the farmer's objective.

Method - A method is needed whereby this knowledge can be utilized to arrive at the best solution to the problem at hand. In most cases, the method used should be formal rather than informal. In other words, data should be set down in a logical framework where all of the relevant alternatives can be analyzed and then the appropriate alternative(s) selected.

EXAMPLE

DEFINE THE PROBLEM

Objective - How long can numerous farmers continue to ignore the fact that some enterprises they are engaged in could be replaced by one that could make more money? Personal preferences, no matter how strong, are modified today by the economic strength of expanding firms now beginning to dominate in important areas of agriculture. Overall, it seems plausible that the primary objective of the farmer must increasingly be profit maximization. Therefore, in the following analysis it is assumed that the farmer's objective is one of profit maximization.

Restrictions - After dtermining the farmer's objective, the next step is to identify the production restrictions on the farm. What limits the amount of each product that can be produced or prohibits a product from being produced at all?

These may be physical restrictions such as limited amounts of land, labor, etc. Subjective limitations may be imposed such as the operator desiring a winter vacation (i.e., this reduces the amount of labor available during the vacation period). Other restrictions may be imposed externally such as conditions for participation in government feed grain programs where the operator is restricted as to the maximum amount of corn he can grow and must agree to divert a certain amount of acreage from production. Determination of these restrictions is essential for determining what production alternatives exist, what technologies are applicable, and what restrictions or limits exist for each alternative.

Alternatives - The next step is specification of relevant alternatives for attaining the objective. What products can be produced on this particular farm? Although physical factors such as soil, climate, and topography determine the general limits for a particular farm, the specific enterprise(s) selected is modified by numerous economic factors. Important economic factors that affect enterprise selection include: 1) commodity sale prices and marketing costs, 2)costs (variable) of production for each product, 3) resources available and requirements per unit (i.e., head, bushel, acre, etc.) of product produced, 4) production information for each product, and 5) management ability of the operator with respect to each enterprise.

ASSEMBLE DATA

After the problem has been specified (i.e., objective, restrictions, and alternatives specified) relevant data necessary must be assembled. The decision method used here requires that data be assembled in the form of enterprise budgets for each alternative. In order to determine the enterprise combination which maximizes profit, it is first of all, necessary to know what each enterprise would contribute to the farm's overall profit. The first step in preparing these budgets is to estimate the expected receipts per unit of product produced. The relevant price for a product for a particular farmer is the net price he is actually paid. This is the market price less all marketing costs.

Expected variable costs (costs which vary with the crop produced and the level of production such as fuel, seed, fertilizer, etc.) of production per unit are than deducted from expected receipts to arrive at the return above variable costs. Fixed costs (interest on mortgages, building depreciation, insurance, taxes, etc.) are not decision-making costs in the short-run (i.e., assumed to be one year here). These costs will be the same amount and must be paid regardless of the products produced or the level of production. Thus, they need not be used in enterprise selection and are not allocated to the various enterprises. The production plan which maximizes profit to fixed factors will also maximize net profit to the farm. These costs will be accounted for later in the planning process.

Variable cost data should ideally come from the individual farm records. Data available on a particular farm are, however, limited to alternatives in which the farmer has had experience. Hence, they must be supplemented when alternatives to be considered are beyond the farmer's own experience. It will be necessary to use "canned" data (i.e., data from research and other farms) for enterprises for which records are not available.

Certain production data is required for each enterprise in order to calculate receipts and expenses per unit. For example, the pounds of various fertilizer nutrient to be applied has to be determined in order to calculate variable costs and the yield per acre has to be determined before total receipts per acre can be calculated. Similar information such as expected rate of gain, number of pigs weaned per litter, and feed requirements must be estimated in order to calculate receipts and expenses for livestock.

As with the cost data previously mentioned, production data should be based upon past experiences on the farm, however, information is limited again to alternatives in which the farmer has had experience.

Management's influence on data used in the budget cannot be over-emphasized. Costs, yields, and other requirements are all influenced substantially by the managerial ability with respect to each enterprise, primarily with regard to experience and knowledge of scientific principles, and must be analyzed closely. The operator may be a very good crop man but poor with regard to livestock. On the other hand, he may be a good dairy man but poor with respect to hogs. Poor management with respect to a particular enterprise may be the result of lack of knowledge and/or experience or perhaps it is primarily the result of dislike for working with that particular enterprise. In any case, all data used must reflect the manager's actual or expected performance.

COMPARE ALTERNATIVES AND SELECT AND BEST ONE(S)

Let us assume that all relevant enterprises have been budgeted. Total expected receipts and variable expenses have been estimated for each enterprise. In other words, the return above variable costs has been calculated for each. The next step in the decision method used is to develop a table which shows certain fixed resource requirements per unit of each enterprise. The rate of use of the fixed resources by enterprise must be specified. For example, to produce a hundred bushels of corn requires one acre of land, 7.5 hours of labor, and $41 of operating capital. Ideally, these coefficeints should come from the individual farm's records. However, if the data are not available "canned" data must be used.

Resource requirements are specified in Table No. 1. This is done by making one row for each of the resource restrictions and one column for each enterprise. One additional row is used to show the returns above variable cost for each enterprise. Two additional columns are provided to identify the resource restrictions and to indicate the maximum number of units of each resource available. (In the example, only four resource restrictions are used - labor, operating capital, acreage, and buildings). These then are the data necessary for evaluating alternatives in the farm organization. As an example, returns above variable cost per dairy cow is $368. Each cow requires 75 hours of labor, $450 operating capital, and one head of building space. There is no acreage restriction on dairy because a drylot system is assumed. Similar information is presented for sheep, feeder pigs and corn.

Table No. 1 - Returns Above Variable Costs And Resource Requirements Per Unit

Resource	Amount Available	Dairy [1]	Sheep [2]	Feeder Pigs [3]	Corn [4]
Returns above Var. Costs		$368	$7	$166	$47
Labor requirements (hours)	3,000	75	4	20	7.5
Operating capital (dollars)	15,000	450	25	51	41
Acreage	240 [5]	---	.33	--	1.0
Buildings	--- [6]	1.0	--	1.0	---

1/ Dairy- a unit refers to one dairy cow producing 13,500 pounds of milk
2/ Sheep- a unit refers to one ewe with 120% lamb crop
3/ Feeder pigs- a unit refers to two litters with an average of 7 pigs per litter weaned.
4/ Corn- a unit refers to one acre producing 80 bushels
5/ Acreage- 240 total acres available but only 80 acres suitable for corn
6/ Buildings- The same building is not used for dairy (35 head capacity) and feeder pigs (40 litter capacity per year). Sheep do not require building space and adequate storage for corn is available.

After determining per unit requirements for each of these resources, the most limiting resource for each enterprise must be determined. This is found by calculating the maximum number of units of each enterprise that can be produced as permitted by the availability of a resource. (Amounts of the various resources available can usually be specified quite easily.) For example, Table No. 2 indicates that there is sufficient labor available to keep 40 dairy cows (i.e., 3,000 divided by 75) enough operating capital to maintain 33 cows (i.e., $15,000 divided by $450) and enough buildings to milk 35 cows. These values are calculated by dividing the amount of each resource required per unit of the enterprises into the amount of that particular resource available. The smallest number in the column under each enterprise is the maximum amount of that enterprise possible in any farm operation. Thus, the limiting resource for dairy is operating capital.

Table No. 2 - Maximum Number Of Units Allowed By Each Resource

Resource	Amount	Dairy	Sheep	Feeder Pigs	Corn
Labor	3,000	40	750	150	400
Capital	$15,000	[33]	[600]	294	366
Acreage	240-80	--	720	---	[80]
Buildings	---	35	---	[20]	---

Thirty-three dairy units requires all of the operating capital available and the dairy enterprise cannot be expanded beyond this number until more operating capial becomes available. Even though sufficient labor, acreage, and buildings are available for more cows the maximum that can be raised is thirty-three. Operating capital is also the most limiting resource for shiip but building capacity is most limiting feeder pigs and acreage most limiting for corn. (These are indicated by the boxes in Table No. 2.)

It should be pointed out here that no provision is made for corn labor requirements in determining the maximum number of dairy cows that can be produced. In other words, each enterprise is considered separately, and the maximum amount is the amount that could be produced if only that particular enterprise were included in the farming operation.

The next step with this method is to estimate maximum possible returns above variable costs from each enterprise. In other words, if it is assumed that only one enterprise is grown on the farm, what would be the maximum expected returns above variable costs possible. The maximum returns for each enterprise is determined by multiplying the smallest number in each enterprise column in Table No. 2 by the expected return above variable cost per unit of each enterprise given in Table No. 1. The maximum return from dairy would be $12,144 (i.e., $368 times 33 head), $4,200 for sheep, $3,320 for feeder pigs, and $3,760 for corn.

Next, the enterprise with the highest total expected return above variable costs is selected as the major enterprise. The largest size unit of this major cash enterprise should be maintained which can be achieved without sacrificing income from other enterprises.

The final step with this method is to determine if any complimentary and/or supplementary enterprises may be added to maximize total income. Since most farms are not located in areas where the comparative advantage of a single enterprise is so great that one product should be produced exclusively, a combination of enterprises is usually most profitable. (A combination here refers to 2 or 3 enterprises.) Also, because there are few major cash enterprises which fully utilize all the resources of a particular farm business throughout the year, most farms have several opportunities for additional enterprises. Such enterprises serve to generate additional income by using fixed resources which would otherwise remain idle.

The objective of the individual farmer is to earn the highest possible net income from the entire farm. Too frequently farmers forget that a high return on a single enterprise does not necessarily mean that maximum returns for the entire farm have been obtained. For example, a neighbor, even though a less efficient dairyman, by combining hogs and some other cash crops with his dairy activity may make a larger net return. The combination of activities (that result in more diversification) utilizes the total available resources to better advantage.

The individual farmer must look at all income opportunities for the entire farm. Even if an enterprise produces a small net return, it should be included if no other enterprise will return as much. Also, some enterprises, although more profitable than others, must be omitted if their production conflicts with the major opportunities.

Many farmers tend to try and sell their entire years labor at as high a rate as possible. For example, corn returns $6.25 per hour on the example farm but only for 600 hours while dairy returns only $4.90 per hour but for about 2,500 hours. If off-farm employment is not a possible alternative, the operator is clearly better off having dairy as the sole enterprise rather than corn. Assuming fixed costs of $3,500 the net to the operator milking 33 head would be $8,644 but only $240 raising 80 acres of corn.

Dairy is the major cash enterprise on the example farm. Thirty-three dairy units requires $14,850 operating capital, or almost the entire amount available, but 500 hours of labor and all of the tillable acreage is unused. The farmer must determine if it is possible to increase his income by combining another enterprise, which utilizes relatively more of these resources, with dairy. However, in order to raise any other enterprise, the number of dairy units must be reduced. This is necessary because all enterprises considered required operating capital, and thirty-three dairy units utilizes all of the operating capital available. Table No. 1 indicates that dairy requires capital and labor in a 6:1 ratio, sheep 6¾:1, feeder pigs 2.5:1, and corn 5.5:1. Thus, sheep and corn require capital and labor in approximately the same ratio as dairy but feeder pigs require substantially less capital relative to labor. For example, this means 18 sheep units or 10 acres of corn requires approximately the same total amounts of labor and capital as one dairy unit. However, for feeder pigs, approximately 9 units requires the same amount of capital as one dairy unit, but 2.5 feeder pig units requires the same amount of labor as one dairy unit.

The farmer would <u>not</u> reduce his dairy herd in order to raise sheep because 18 sheep units adds only about $130 to profit compared to $368 for one dairy unit. Total profit would be decreased by $238 with each such substitution.

Ten acres of corn would return $470 compared to $368 for one dairy unit. This would certainly appear to be a profitable substitution. However, only total labor usage per unit has been taken into account thus far. The seasonality of labor requirements has not been considered. The seasonal distribution of labor usage must be taken into account along with estimated total labor usage for an enterprise. This is especially true of crops where labor requirements are not evenly distributed throughout the year but in fact bunched into three or four months. On the example farm, dairy labor requirements are assumed to be fairy evenly distributed over the entire year (6.3 hours per month) while corn requires 1.5 hours in May and approximately the same amount in October. Therefore, the substitution rate between corn and dairy is 4.2:1 with respect to labor when we consider seasonal requirements. Dairy units would have to be reduced by one for each 4.2 acres of corn grown. This would mean a loss of $171 ($368 less $197) for each substitution. Obviously, this is an unprofitable substitution.

Feeder pigs is another alternative on the farm. Is it profitable to substitute feeder pigs for some of the dairy units? It would appear that this may be a profitable substitution because feeder pigs require considerably less capital relative to labor compared to dairy (2.5:1 compared to 6:1). Since capital is the most critical resource with respect to dairy this is the resource to be concerned with when investigating substitution possibilities. (Ample unused labor is available). Nine feeder pig units require the same amount of operating capital as one dairy unit. Such a substitution would increase profit by $1,126 ($1,494 less $368). Substituting 18 units of feeder pigs for two dairy units increases profit by $2,252. Nine more units cannot be substituted because farrowing capacity restricts the farm to 20 units per year.

Thus, only two more feeder pig units can be added. Is it profitable to add the two additional units? With 31 dairy units and 18 feeder pig units $14,870 operating capital is used and 2,700 hours of labor. Thus, sufficient capital and labor is available to add the additional two units. This leaves only $30 of operating capital and less than 250 hours of labor unused. Therefore, on this farm, profit is maximized with 31 dairy units and 20 feeder pig units. Corn would not be grown but would instead be purchased for feed. Assuming $3,500 fixed costs, expected profit on this example farm would be $11,228 (i.e., $14,728 less $3,500).

EXPANSION

A farm business that is presently organizationally and operationally efficient still must have sufficient volume to survive. The preceeding discussion was concerned with organizing present resources. In addition, the operator must be looking to the future and be concerned with expansion. Expansion may mean expanding existing enterprises or adding new ones to increase total farm profit. The same procedure as just illustrated can be used for making such decisions. Restriction levels and other relevant data can be changed to reflect various alternative investments. For example, the operator on this farm may want to consider adding additional farrowing facilities. Thus, the farrowing building restriction, variable costs, labor requirements, operating capital requirements, and etc. for feeder pigs would be adjusted to reflect the addition. Since the farrowing facility has to be added, all costs associated with its use would be considered as variable. The fixed cost per unit of use for the building may be obtained by dividing the total ownership costs of the building (including taxes, insurance, repairs, interest and depreciation) for the expected length of life of the building by the total number of units for which this building might be used during its expected life. The estimated fixed cost per unit of use of the particular building would than be included in the enterprise budget. The same procedure is applicable to machinery and equipment for other enterprises.